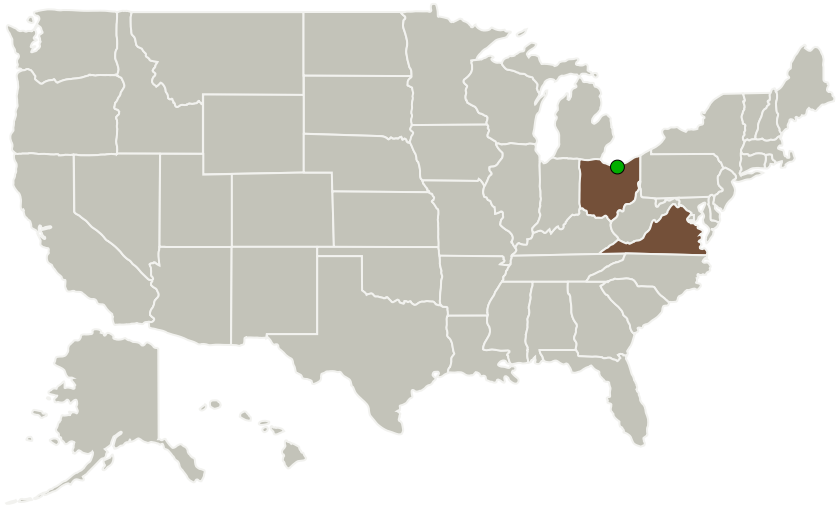
Multifunctional Dust Filters for Crew Cabin Air Purification, Phase I

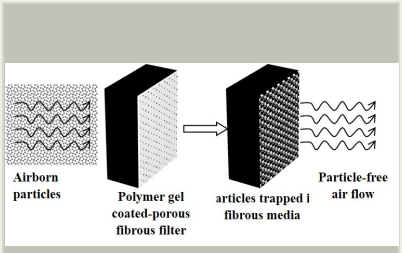
Completed Technology Project (2015 - 2015)

Project Introduction

In the crew compartment of a spacecraft, dust that is self-generated or from other activities pose a respiratory irritant, especially within a small, confined space. Therefore air cabin filtration technologies should be improved for future spacecrafts to efficiently remove the range of particulate matter sizes (nano to micron size). It is also desirable to have the new particulate air filters that can be efficiently remove volatile organic chemicals (VOCs) and self-regenerated. This will reduce the logistics burden of carrying additional replacement filters on-board. In the proposed Phase I effort, smart fibrous filters with both particle and VOC removal capacities will be developed. The new particulate filters will be much more efficient than the current HEPA filters and also capable of self-regenerating. The Phase I effort will focus on demonstration of the 'proof of concept' that fibrous filters can filter and remove the ultrafine (<0.5 μm) particulates and destructively adsorb organic chemicals such as acetone. The technical approach will also involve regeneration of filters using a low-energy process. In the Phase II project, selective filtration membranes will be designed and modified to fit the NASA's current cabin air filtration systems.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Materials Modification, Inc.	Lead Organization	Industry Small Disadvantaged Business (SDB)	Fairfax, Virginia
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
Ohio	Virginia

Project Transitions

June 2015: Project Start

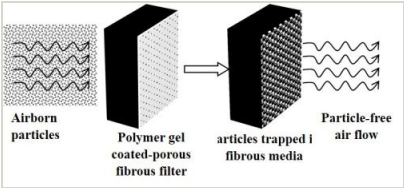
December 2015: Closed out

Closeout Summary: Multifunctional Dust Filters for Crew Cabin Air Purification, Phase I Project Image

Closeout Documentation:

- Final Summary Chart Image*(https://techport.nasa.gov/file/139264)*

Images



Briefing Chart Image
Multifunctional Dust Filters for Crew Cabin Air Purification, Phase I *(https://techport.nasa.gov/image/131117)*

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Materials Modification, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

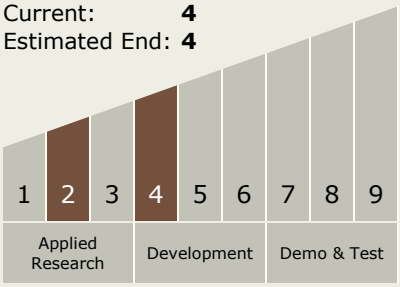
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Krishnaswamy K Rangan

Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.4 Environmental Monitoring, Safety, and Emergency Response
    - TX06.4.4 Remediation

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System